

I claim:

1. Apparatus for processing image data, comprising instruction storage means, central processing means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it; wherein

said color monitor requires a first gamma transformation to satisfy a calibration requirement;

said image data requires a second gamma transformation to satisfy a compensation requirement; and

said instruction storage means includes instructions for said central processing means to perform the steps of

combining said first and second transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to said compensation requirement but not said calibration requirement.

2. Apparatus according to claim 1, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

addressing a table representing said first gamma transformation to generate first data,

addressing a table representing said second gamma transformation with said first data to generate second data, and

supplying said second data to said look-up means for use as said transformation data.

3. Apparatus according to claim 1, wherein said look-up means is

addressed by image data, and said look-up means has its data output supplied via input/output multiplexing means to digital-to-analog means for said monitor.

4. Apparatus according to claim 1, wherein said second gamma transformation is a gamma compensation required for film.

5. Apparatus according to claim 1, wherein a transformation is defined by red, green and blue look-up tables.

6. Apparatus according to claim 1, wherein said look-up means comprises red, green and blue tables for the dedicated purpose of receiving address signals representing image data and transforming said address signals in accordance with transformation data for red, green and blue color channels, said look-up means being multiplexed such that transformation data may be transferred into said look-up means via a bi-directional data bus.

7. Apparatus according to claim 6, including main memory means, wherein said main memory means is configurable by said central processing means in response to instructions on said instruction storage means to perform the steps of:

loading said gamma transformations into look-up tables in said main memory, and

combining data from said look-up tables in main memory to generate transformation data for said look-up means.

8. Apparatus according to claim 1, including main memory means, wherein said look-up means is implemented in said main memory, and image data is transformed by said look-up means in main memory before

transmission to said graphical processing means.

9. Apparatus for processing image data, comprising instruction storage means, central processing means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it; wherein

said color monitor requires a first gamma transformation to satisfy a calibration requirement;

said image data requires a second gamma transformation to satisfy a compensation requirement;

said image data requires a third gamma transformation to satisfy an overall gamma requirement; and

said instruction storage means includes instructions for said central processing means to perform the steps of

combining said transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to said compensation and overall gamma requirements but not said calibration requirement.

10. Apparatus according to claim 9, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

addressing a table representing said first gamma transformation to generate first data,

addressing a table representing said second gamma transformation with said first data to generate second data,

addressing a table representing said third gamma transformation with

said second data to generate third data, and

supplying said third data to said look-up means for use as said transformation data.

11. Apparatus according to claim 9, wherein said look-up means is addressed by image data, and said look-up means has its data output supplied via input/output multiplexing means to digital to analog means for said monitor.

12. Apparatus according to claim 9, wherein said second gamma transformation is a gamma compensation required for film.

13. Apparatus according to claim 9, wherein a transformation is defined by red, green and blue look-up tables.

14. Apparatus according to claim 9, wherein said look-up means comprises red, green and blue tables for the dedicated purpose of receiving address signals representing image data and transforming said address signals in accordance with transformation data for red, green and blue color channels, said look-up means being multiplexed such that transformation data may be transferred into said look-up means via a bi-directional data bus.

15. Apparatus according to claim 14, including main memory means, wherein said main memory means is configurable by said central processing means in response to instructions on said instruction storage means to perform the steps of:

loading said gamma transformations into look-up tables in said main memory, and

combining data from said look-up tables in main memory to generate

data for said look-up means.

16. Apparatus according to claim 9, including main memory means, wherein said look-up means is implemented in said main memory, and image data is transformed by said look-up means in main memory before transmission to said graphical processing means.

17. Apparatus for processing image data, comprising instruction storage means, central processing means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it; wherein a plurality of gamma transformations are required to satisfy a plurality of respective gamma requirements; and said instruction storage means includes instructions for said central processing means to perform the steps of

combining said transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to at least one of said gamma requirements.

18. Apparatus according to claim 17, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

- (a) addressing a table representing a first gamma transformation to generate next data,
- (b) addressing an additional table representing an additional transformation with said next data to generate new next data,
- (c) repeating step (b) for each further additional table representing

an additional transformation, until a table has been addressed and data generated for each of said gamma transformations, and

(d) supplying the newest next data to said look-up means for use as said transformation data.

19. Apparatus according to claim 17, wherein said look-up means is addressed by image data, and said look-up means has its data output supplied via input/output multiplexing means to digital to analog means for said monitor.

20. Apparatus according to claim 17, wherein a transformation is defined by red, green and blue look-up tables.

21. Apparatus according to claim 17, wherein said look-up means comprises red, green and blue tables for the dedicated purpose of receiving address signals representing image data and transforming said address signals in accordance with transformation data for red, green and blue color channels, said look-up means being multiplexed such that transformation data may be transferred into said look-up means via a bi-directional data bus.

22. An image processing apparatus according to claim 21, including main memory means, wherein said main memory means is configurable by said central processing means in response to instructions on said instruction storage means to perform the steps of:

loading said gamma transformations into look-up tables in said main memory, and

combining data from said look-up tables in main memory to generate data for said look-up means.

23. Apparatus according to claim 17, including main memory means, wherein said look-up means is implemented in said main memory, and image data is transformed by said look-up means in main memory before transmission to said graphical processing means.

24. A method of processing image data, in which an image processing system comprises instruction storage means, central processing means and graphical processing means, wherein

said graphical processing means is arranged to receive image data and display resulting images on a color monitor, and includes look-up means for transforming image data supplied to it,

said color monitor requires a first gamma transformation to satisfy a calibration requirement, and

said image data requires a second gamma transformation to satisfy a compensation requirement;

comprising the steps of

combining said first and second transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to said compensation requirement but not said calibration requirement.

25. A method according to claim 24, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

addressing a table representing said first gamma transformation to generate first data,

addressing a table representing said second gamma transformation requirement with said first data to generate second data, and

supplying said second data to said look-up means as said transformation data.

26. A method according to claim **24**, wherein said step of supplying images to said look-up means results in addressing data in said look-up means, and said addressed data is supplied as gamma-corrected image signals to said monitor.

27. A method according to claim **24**, including storing data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

28. A method according to claim **24**, including retrieving data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

29. A method according to claim **24**, wherein said calibration requirement has been determined by a calibration process comprising steps of:

requesting a user to place a colorimeter on the screen of said monitor, supplying signals to said monitor representing a color and luminance, receiving measurements from said colorimeter representing said color and luminance, and

determining a calibration requirement in response to a comparison between representations of said monitor signals and said measurements.

30. A method according to claim **24**, wherein said second gamma transformation is a gamma compensation required for film.

31. A method according to claim **24**, wherein a transformation is defined by red, green and blue look-up tables.

32. A method of processing image data, in which an image processing system comprises instruction storage means, central processing means and graphical processing means, wherein

said graphical processing means is arranged to receive image data and display resulting images on a color monitor and includes look-up means for transforming image data supplied to it,

said color monitor requires a first gamma transformation to satisfy a calibration requirement,

said image data requires a second gamma transformation to satisfy a compensation requirement, and

said image data requires a third gamma transformation to satisfy an overall gamma requirement;

comprising the steps of

combining said transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to said compensation and overall gamma requirements but not said calibration requirement.

33. A method according to claim **32**, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

addressing a table representing said first gamma transformation to generate first data,

addressing a table representing said second gamma transformation

requirement with said first data to generate second data,
addressing a table representing said third gamma transformation to
generate third data, and
supplying said third data to said look-up means as said transformation
data.

34. A method according to claim **32**, wherein said step of supplying
images to said look-up means results in addressing data in said look-up
means, and said addressed data is supplied as gamma-corrected image
signals to said monitor.

35. A method according to claim **32**, including storing data
representing said requirements in response to a user's request using a
graphical user interface presented to said user on said monitor.

36. A method according to claim **32**, including retrieving data
representing said requirements in response to a user's request using a
graphical user interface presented to said user on said monitor.

37. A method according to claim **32**, wherein said calibration
requirement has been determined by a calibration process comprising steps
of:
requesting a user to place a colorimeter on the screen of said monitor,
supplying signals to said monitor representing a color and luminance,
receiving measurements from said colorimeter representing said color
and luminance, and
determining a calibration requirement in response to a comparison
between representations of said monitor signals and said measurements.

38. A method according to claim **32**, wherein said second gamma transformation is a gamma compensation required for film.

39. A method according to claim **32**, wherein a transformation is defined by red, green and blue look-up tables.

40. A method of processing image data, in which an image processing system comprises instruction storage means, central processing means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it, wherein

a plurality of gamma transformations are required to satisfy a plurality of respective gamma requirements, comprising steps of

combining said transformations to define transformation data in said look-up means, and

supplying images to said look-up means such that images displayed on said monitor are transformed in response to at least one of said gamma requirements.

41. A method according to claim **40**, wherein said combining step is performed by executing instructions stored in said storage means such that said central processing means performs the steps of:

(a) addressing a table representing a first gamma transformation to generate next data,

(b) addressing an additional table representing an additional transformation with said next data to generate new next data,

(c) repeating step (b) for each further additional table representing an additional transformation, until a table has been addressed and data

generated for each of said gamma transformations, and

(d) supplying the newest next data to said look-up means for use as said transformation data.

42. A method according to claim **40**, wherein said step of supplying images to said look-up means results in addressing data in said look-up means, and said addressed data is supplied as gamma-corrected image signals to said monitor.

43. A method according to claim **40**, including storing data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

44. A method according to claim **40**, including retrieving data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

45. A method according to claim **40**, wherein a transformation is defined by red, green and blue look-up tables.

46. A computer-readable medium having computer-readable instructions executable by a computer, said computer comprising instruction storage means, central processing means controllable from said instruction storage means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it, wherein

said color monitor requires a first gamma transformation to satisfy a calibration requirement, and

said image data requires a second gamma transformation to satisfy a compensation requirement;
wherein said instructions configure said central processing means to:
combine said first and second transformations to define transformation data in said look-up means, and
supply images to said look-up means such that images displayed on said monitor are transformed in response to said compensation requirement but not said calibration requirement.

47. A computer-readable medium according to claim **46**, wherein said combining step comprises the following steps:

addressing a table representing said first gamma transformation to generate first data,
addressing a table representing said second gamma transformation requirement with said first data to generate second data, and
supplying said second data to said look-up means as said transformation data.

48. A computer-readable medium according to claim **46**, wherein said step of supplying images to said look-up means results in addressing data in said look-up means, and said addressed data is supplied as gamma-corrected image signals to said monitor.

49. A computer-readable medium according to claim **46**, including storing data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

50. A computer-readable medium according to claim **46**, including retrieving data representing said requirements in response to a user's request

using a graphical user interface presented to said user on said monitor.

51. A computer-readable medium according to claim **46**, wherein said calibration requirement has been determined by a calibration process comprising steps of:

requesting a user to place a colorimeter on the screen of said monitor,
supplying signals to said monitor representing a color and luminance,
receiving measurements from said colorimeter representing said color and luminance, and

determining a calibration requirement in response to a comparison between representations of said monitor signals and said measurements.

52. A computer-readable medium according to claim **46**, wherein said second gamma transformation is a gamma compensation required for film.

53. A computer-readable medium according to claim **46**, wherein a transformation is defined by red, green and blue look-up tables.

54. A computer-readable medium having computer-readable instructions executable by a computer configured as part of an image processing system, said computer comprising instruction storage means, central processing means controllable from said instruction storage means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color monitor and including look-up means for transforming image data supplied to it, wherein

said color monitor requires a first gamma transformation to satisfy a calibration requirement,

said image data requires a second gamma transformation to satisfy a compensation requirement, and

said image data requires a third gamma transformation to satisfy an overall gamma requirement;

wherein said instructions configure said central processing means to:
combine said transformations to define transformation data in said look-up means, and

supply images to said look-up means such that images displayed on said monitor are transformed in response to said compensation and overall gamma requirements but not said calibration requirement.

55. A computer-readable medium according to claim **54**, wherein said combining step comprises the following steps:

addressing a table representing said first gamma transformation to generate first data,

addressing a table representing said second gamma transformation requirement with said first data to generate second data,

addressing a table representing said third gamma transformation to generate third data, and

supplying said third data to said look-up means as said transformation data.

56. A computer-readable medium according to claim **54**, wherein said step of supplying images to said look-up means results in addressing data in said look-up means, and said addressed data is supplied as gamma-corrected image signals to said monitor.

57. A computer-readable medium according to claim **54**, including storing data representing said requirements in response to a user's request

using a graphical user interface presented to said user on said monitor.

58. A computer-readable medium according to claim **54**, including retrieving data representing said requirements in response to a user's request using a graphical user interface presented to said user on said monitor.

59. A computer-readable medium according to claim **54**, wherein said calibration requirement has been determined by a calibration process comprising steps of:

requesting a user to place a colorimeter on the screen of said monitor,
supplying signals to said monitor representing a color and luminance,
receiving measurements from said colorimeter representing said color
and luminance, and

determining a calibration requirement in response to a comparison
between representations of said monitor signals and said measurements.

60. A computer-readable medium according to claim **54**, wherein said second gamma transformation is a gamma compensation required for film.

61. A computer-readable medium according to claim **54**, wherein a transformation is defined by red, green and blue look-up tables.

62. A computer-readable medium having computer-readable instructions executable by a computer configured as part of an image processing system, said computer comprising instruction storage means, central processing means controllable from said instruction storage means and graphical processing means, said graphical processing means being arranged to receive image data and display resulting images on a color

monitor and including look-up means for transforming image data supplied to it, wherein

a plurality of gamma transformations are required to satisfy a plurality of respective gamma requirements,

wherein said instructions configure said central processing means to:

combine said transformations to define transformation data in said look-up means, and

supply images to said look-up means such that images displayed on said monitor are transformed in response to at least one of said gamma requirements.

63. A computer-readable medium according to claim 62, wherein said combining step comprises the following steps:

(a) addressing a table representing a first gamma transformation to generate next data,

(b) addressing an additional table representing an additional transformation with said next data to generate new next data,

(c) repeating step (b) for each further additional table representing an additional transformation, until a table has been addressed and data generated for each of said gamma transformations, and

(d) supplying the newest next data to said look-up means for use as said transformation data.

64. A computer-readable medium according to claim 62, wherein said step of supplying images to said look-up means results in addressing data in said look-up means, and said addressed data is supplied as gamma-corrected image signals to a color monitor.

65. A computer-readable medium according to claim 62, including

storing data representing said requirements in response to a user's request using a graphical user interface presented to said user on a monitor.

66. A computer-readable medium according to claim **62**, including retrieving data representing said requirements in response to a user's request using a graphical user interface presented to said user on a monitor.

67. A computer-readable medium according to claim **62**, wherein a transformation is defined by red, green and blue look-up tables.